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ABSTRACT

This packet is one of the "Exploration" series of curriculum materials developed for junior high and middle school industrial educators. The Exploration Series is intended to help them provide seventh- and eighth-grade students an opportunity to explore a wide range of industrial situations as well as some of the technologies used in the industry. The documents may also serve as a resource for teachers orienting ninth- and tenth-grade students to the industrial technologies of communication, production, energy utilization, and transportation and the impact of industry and technology. This packet is one unit in the area of the impact of industry and technology. It includes a rationale, hints to the teacher, lesson plans for two lessons (objectives, lesson content, and learning activities), student handouts for each lesson, teacher aids for the lessons, a unit examination, and a list of references. The lesson topics are recycling materials and evaluation. (YLB)

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The Illinois Plan for Industrial Education

Illinois State Board of Education

Adult, Vocational and Technical Education

ED296098

RECYCLING MATERIALS

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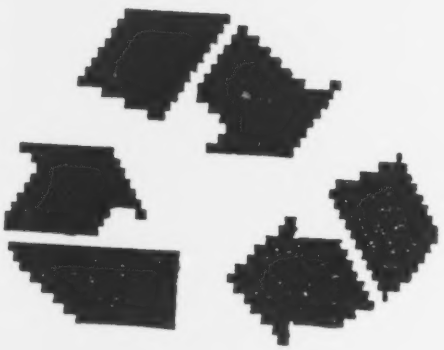
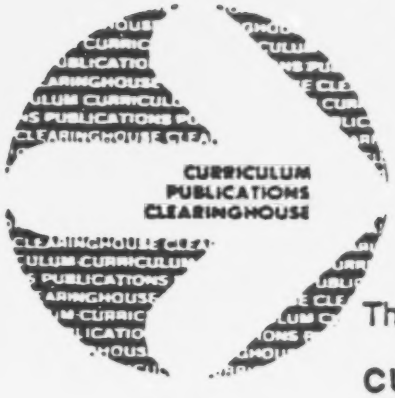
PACKET INCLUDES:

- Rationale
- Hints to the Teacher
- Lesson Plans
- Student Handout Masters
- Teacher Aides
- Unit Examination
- References





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INTRODUCTION

"Recycling Materials" is one of a series of curriculum materials developed for junior high and middle school industrial educators. Listed below are the titles of the units in the series.

Communication
- Using the Language of Industry
- Exploring Computer Technology
- Exploring Photography
- Exploring Graphic Communication
- Exploring Electronic Communication

Energy Utilization
- Exploring Solar Energy
- Using Alternate Energy Sources
- Conserving Energy Sources
- Exploring Electricity/Electronics
- Exploring Mechanical and Fluid Systems

Impact of Industry and Technology
- Recycling Materials
- Limiting Pollution
- Exploring Careers in Industry and Technology
- Exploring Technology and the Future

Production
- Exploring Materials and Processes
- Exploring Construction Technology
- Research and Development
- Exploring Manufactured Systems
- Servicing Products

Transportation
- Exploring Land Transportation Systems
- Exploring Aviation Technology
- Exploring Water Transportation Systems
- Exploring Space Transportation Systems
- Exploring Materials Handling Systems

With the Exploration Series, industrial educators can lead their 7th and 8th grade students in exploring many industrial situations and technologies used in industry. In addition, this series can serve as a resource for teachers orienting 9th and 10th grade students to industrial technologies in communication, production, energy utilization and transportation. Each unit in the series includes a rationale, hints to the teacher, lesson plans, student handouts, teacher aids, a unit examination, and a list of references.

"Recycling Materials" and other units in the series are available on a cost recovery basis through the Curriculum Publications Clearinghouse, Western Illinois University, Horrabin Hall 46, Macomb, IL 61455.

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RECYCLING MATERIALS

Rationale

In our technological society, individuals and industrial organizations produce large amounts of waste. One of the biggest challenges facing society is how to dispose of our waste products. One of the most promising solutions is to recycle many of the materials we try to throw away. For recycling to be a viable solution, everyone needs to understand the need for recycling and how to participate in recycling programs.

During the following unit, students will learn how recycling can help conserve our natural resources, save energy, and reduce pollution. Through hands-on activities, students will experience how recyclable materials are technologically collected, sorted, and reprocessed. Lastly, students will conduct a recycling campaign. During the campaign, they will select a recyclable material, develop a recycling strategy, promote recycling, execute their strategy, and report the results.

RECYCLING MATERIALS

Hints to the Teacher

1. This unit represents an excellent opportunity to promote technology education in your school community. Once your recycling campaign is underway, invite reporters to visit your school and interview students. Consider asking your local radio station to provide a public service announcement encouraging members of the community to participate in the recycling campaign.

2. Consider complimenting your instruction with films and/or videotapes on recycling. Prior to implementing this unit, contact your local film library for more information.

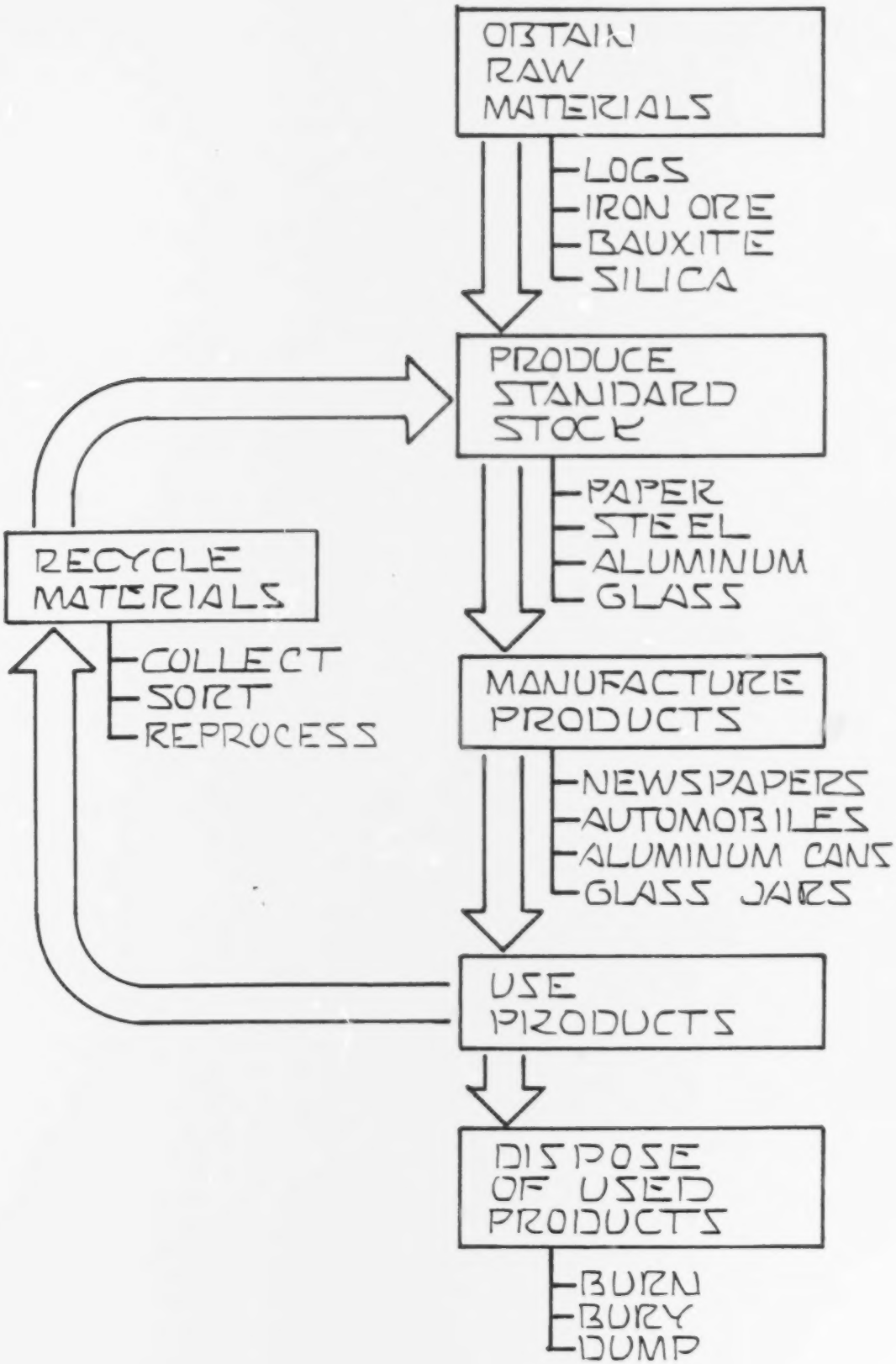
3. Another way to compliment your instruction is to invite guest speakers to talk to your class about recycling. Consider contacting your local recycling center(s), disposal companies and/or salvage companies.

4. If time and resources do not allow you to conduct a recycling campaign, consider using the paper recycling demonstration for an alternate lab activity. To enable all students to experience the recycling process, you will need additional plastic tubs, newspapers, and frames. In addition, you will need larger quantities of corn starch and bleach. Students can take turns mixing pulp in a blender and drying paper with a clothes iron.

5. Conducting a successful recycling campaign requires a lot of cooperation and teamwork. Consider asking other teachers in classes to participate in the recycling effort.

6. Deemphasize the monitary rewards of recycling materials. Stress the importance of conserving raw materials, saving energy, and reducing pollution. If too much emphasis is put on raising money through recycling, your students are apt to be disappointed.

RECYCLING MATERIALS



Unit: Recycling Materials

Lesson 1: Recycling Materials

Objectives	Lesson Content	Learning Activities	Ref
A. Following a discussion, students will be able to: -identify a definition for recycling. -identify three conventional garbage disposal strategies -identify at least six recyclable materials. -identify the technological impacts of three recycling materials. -identify descriptions for the three basic recycling processes.	A. Recycling 1. Garbage disposal strategies a. burying it in landfills b. burning it in incinerators c. dumping it on the land or in bodies of water 2. Recycling is reusing materials to make new products. 3. Recyclable materials a. aluminum b. steel c. brass d. copper e. lead f. cardboard g. paper h. glass i. organic materials 4. Recycling: a. conserves natural resources b. saves energy c. reduces land, water, and air pollution 5. Basic recycling processes a. collecting b. sorting c. reprocessing	A. Teacher Guided Discussion 1. Ask the students to list the materials they commonly throw out. Discuss the problems associated with our throw-away society 2. Using OT 1-1, discuss the three basic conventional garbage disposal strategies. 3. Using OT 1-2, introduce students to the concept of recycling. 4. Using OT 1-3, identify and discuss recyclable materials. 5. Using OT 1-4, discuss the technological impacts of recycling. 6. Using OT 1-5, discuss the three basic recycling processes.	

B. Following a demonstration, in a lab activity, students will be able to:
- -identify the recycling opportunities in the community.
- -identify the most cost effective recyclable material thrown away at your school.
- -develop a strategy for collecting, sorting, storing, and transporting the recyclable material.
- -conduct an in-school recycling campaign.
- -report the results of their recycling campaign.

B. Conducting a recycling campaign.
1. Investigate the recycling opportunities in your community.
   a. recycling centers
   b. paper companies
   c. salvage companies
2. Identify recyclable materials in your school community
   a. aluminum cans
   b. ledger paper
   c. newspapers
   d. glass containers
3. Evaluate each recycling option
4. Select the most practical and efficient recycling option(s).
5. Plan a recycling campaign
   a. collecting
   b. sorting
   c. storing
   d. transporting
6. Promote the recycling campaign
   a. posters
   b. announcements on the school PA system
7. Implement the recycling strategy
8. Report the results of the recycling campaign
   a. pounds collected
   b. money collected

B. Learning Activities
1. Using a phone book, identify companies that recycle materials in your community.
2. Discuss the materials each recycling center collects and how much they will pay for the materials
3. Ask students list materials that can be recycled.
4. Using the information collected, identify and evaluate each recycling option.
5. Select the most practical and effective recycling option(s).
6. Develop a strategy for collecting, sorting, storing, and transporting recyclable materials.
7. Demonstrate how to use the tools and materials needed to make promotional materials and collection boxes.
8. Have students promote and conduct their recycling strategy.
9. Report the results of the recycling campaign.

RECYCLING MATERIALS

Preparation Hints:

1. Review the materials provided, duplicate HO #1-1, and prepare the transparencies needed to present this lesson.

2. Identifying the best material for your students' recycling campaign depends on who can accept and/or purchase recyclable materials in your area. Prior to implementing this lesson, you will need to identify recycling centers in your community. They can often be found in the yellow pages under "Recycling." If you cannot find a listing under Recycling, consider contacting local paper companies, salvage yards, and/or disposal companies. They often accept and/or purchase recyclable materials or they may be able to direct you to the nearest recycling depot. After you have identified your recycling options, call each center and determine the material(s) they will accept, how they want to receive the materials, and how much they are willing to pay. During a class discussion, use the information collected to select the most cost effective material for the recycling campaign.

3. Implementing a recycling campaign requires a lot of cooperation and teamwork. Prior to implementing this activity, discuss what you propose to do with your school administration, faculty, and janitorial staff. Describe your objectives and learning activity options. Address their concerns prior to implementing the learning activity. For example, your administration might be concerned about possible fire hazards if you collect and store paper. Teachers may be concerned about students disrupting their class when they collect paper. The janitorial staff may want to know what they can and cannot throw away. With everyone's support and cooperation, your recycling campaign cannot help but be a success.

4. During the lab activities, your students will need to make posters promoting recycling. Prior to implementing the learning activity, you will need to establish several work stations. Each station will need to be equipped with things like poster board, magic markers, and pencils. If possible, consider having your students make their posters with a computer equipped with an appropriate graphics program. When

the students have finished their computer-prepared posters, they could use a copy machine to reproduce their posters on colored paper. Have students post their recycling posters throughout the school.

5. If your students are going to collect ledger paper, they will need to make a collection container for every classroom in your school. To save time, you may want to precut the materials for 9" x 11 1/2" collection containers (see Figure 1-7). During the lab activity, your students could assemble and decorate the containers. Another option would be to establish a simple assembly line and mass produce the containers.

6. During the collection process, your students will need to store their recyclable materials in a container. If you are going to collect ledger paper, ask your students to bring grocery bags from home. If you are going to collect aluminum cans, you will need to provide plastic garbage bags. Or, if you are going to collect newspapers, you may want to obtain large boxes from your local grocery and/or department stores.

7. If your students are going to collect aluminum cans, consider making the aluminum can crusher illustrated in Figure 1-1. The design is easy to make and will work in conjunction with most large drill presses. Crushed aluminum cans are easier to store and transport. In addition, crushing is the first technological step in reprocessing aluminum cans.

Content Presentation Hints:

1. When discussing how various materials are recycled, consider drawing flowcharts on your chalkboard. Each flowchart could feature things like raw materials, standard stock, manufactured products, a recycling loop, and a disposal technique. For example, a flowchart illustrating how paper is recycled would feature things like logs, paper, newspapers, recycling, and burning. See Figure 1-2 through 1-5 for additional examples.

2. Consider showing your students a film or video tape on recycling.

3. Consider conducting a field trip to a recycling center, salvage yard, or land fill.

4. Consider asking a representative from a recycling center to talk to your class about recycling.

Learning Activity Hints:

1. Have students prepare posters promoting conservation of raw materials and recycling. For example, one poster could promote buying beverages in returnable bottles instead of disposable plastic and aluminum containers. Another poster could promote using reusable plastic food containers instead of disposable plastic bags, paper bags and aluminum foil. Lastly, other posters could promote recycling as a means to help conserve raw materials, save energy, and reduce pollution. To have the greatest impact, these posters should be made and posted before implementing the recycling campaign.

2. Consider demonstrating how paper is recycled. You will need the following materials for your demonstration:

   - one kitchen blender
   - one clothes iron
   - one tablespoon of corn starch
   - one teaspoon of bleach
   - one gallon of water
   - one plastic tub
   - one 41/2" x 61/2" piece of window screen
   - four 3/4" x 3/4" x 6 1/2" pieces of wood
   - four 3/4" x 3/4" x 3" pieces of wood
   - one stapler equipped with staples
   - one stack of old newspapers

   Before you conduct your demonstration, you will need to use the 3/4" x 3/4" stock to make two frames. Each frame should have a 3" x 5" opening. Staple the 4 1/2" x 6 1/2" piece of screen to one of the frames and trim off the excess (see Figure 1-6).

   Pour approximately two cups of water into the blender. Add one tablespoon of corn starch and one teaspoon of bleach. The corn starch will strengthen the paper and the bleach will whiten the paper.

   Tear a section of newspaper into tiny pieces. Put the pieces of newspaper into the blender until the mixture reaches the full mark. Blend the mixture until it has a slurry-like consistency.

   Pour the mixture into a plastic tub. With the screen side face up, place the open frame on top of the screened frame. Hold both of the frames together and dip the assembly into the slurry. Scoop up a portion of the slurry and distribute it evenly over the top of the screen. Allow the water to drain through the screen back into the plastic tub. The drained mixture should be between 1/8 to 1/4 of an inch thick.

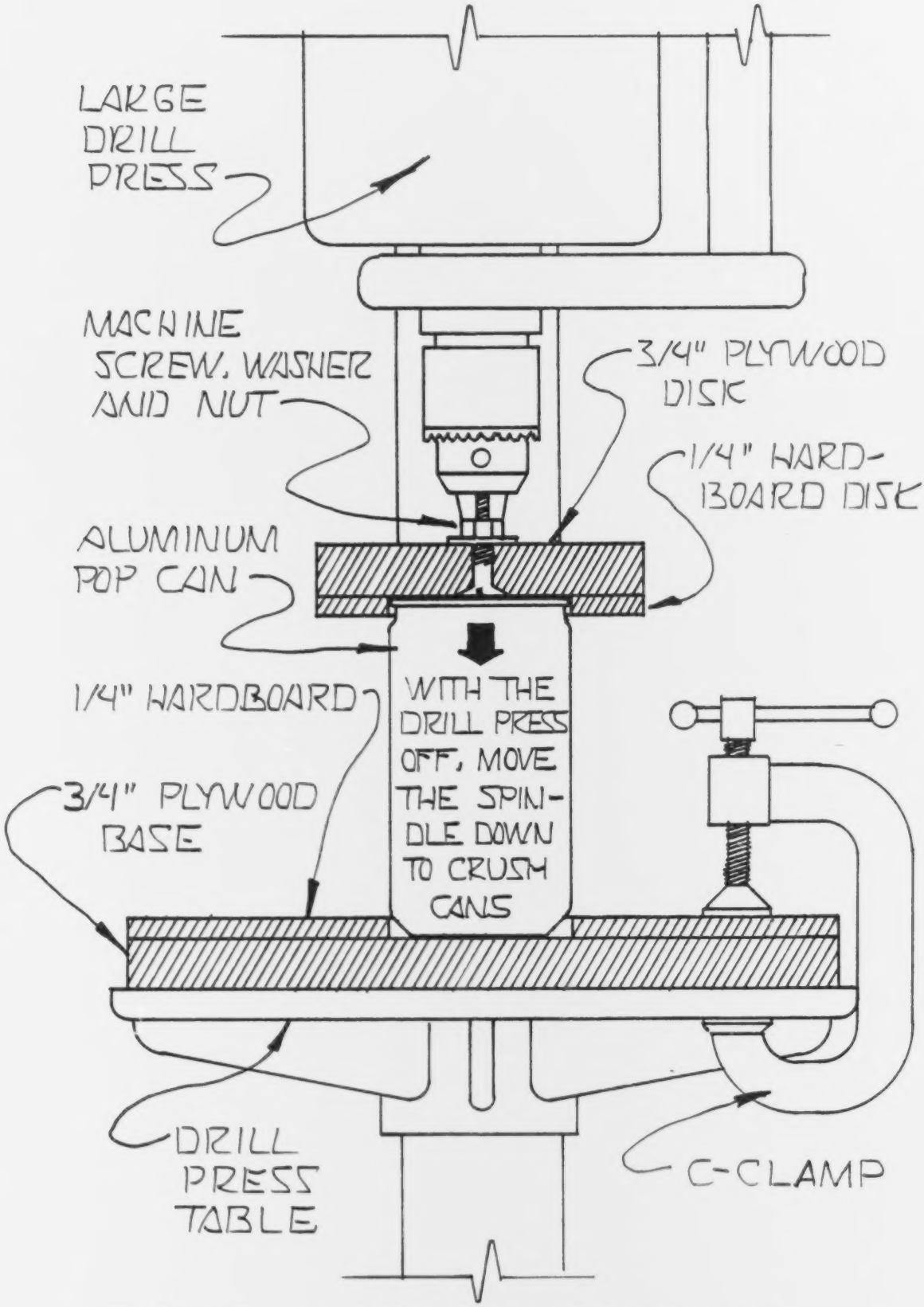


FIGURE 1-1: POP CAN CRUSHER

After most of the water has been drained off, remove the top frame. Lay a clean piece of paper across the top of the mixture. Carefully press the mixture to remove as much excess water as possible. After you have finished pressing the mixture, carefully lift the frame and wipe the bottom of the screen with a paper towel. Continue blotting the mixture and wiping the screen to remove as much water as possible.

Lay several sheets of dry newspaper over the top of a flat surface. Carefully turn the screened frame upside down, and flop the pulp mixture onto the dry newspaper. Carefully lift the screen off the pulp mixture. If the pulp sticks to the frame, use a putty knife to peel it off.

Place a piece of dry newspaper over the top of the pulp mixture. Press the newspaper and pulp mixture with a hot clothes iron. Make sure you keep the iron moving during the pressing process. After most of the moisture has been removed with the clothes iron, allow the paper to air dry for 24 hours.

Discuss how the techniques used during the demonstration are similar to those used by paper recycling industries (e.i., shredding paper, making a water and pulp slurry, draining off the water, pressing the paper with hot rollers). After you have completed the demonstration, consider allowing students to take turns making their own pieces of recycled paper.

3. Consider conducting a landfill degradability study. Begin by having students select a commonly disposed of material. Include among their choices things like aluminum cans, paper plates, styrofoam cups, plastic utencils, plastic bags, aluminum foil, and glass jars. Have students weigh their sample. Record the names of the samples and their original weights on a class chart. Identify an appropriate outdoor site on school grounds for your landfill simulation. Have students bury their samples about one foot underground. Use a wood stake to identify where each sample is buried. After allowing these samples to degrade for about 4 to 6 months, excavate the materials. Clean each item thoroughly. Allow porous materials to dry completely. Weigh each sample and record their weights on the class chart. Divide each sample's decomposed weight by its original weight to determine what percentage of the materials' mass decomposed during the test period. The results should show that some materials decompose faster than other materials.

4. During the material selection process, consider having your class estimate how many pounds of each material could be collected each school day. For example, most of the families in your school community have a newspaper delivered daily. Since many families have more than one student attending your school and not all the students will participate, lets say about half the student population will be bringing a newspaper to school each day for recycling. To estimate how many pounds of newspaper could be collected each day, you could multiply the average weight of a newspaper by the number of students in your school and divide by 2.

   To determine how much ledger paper is thrown away every day in your school, you could sample the contents of three classroom waste baskets. You would need to weigh the ledger paper from each waste basket, add the weights together, and divide the total by three to determine the average amount of ledger paper thrown away in each classroom. Lastly, you would need to multiply your answer by the number of classrooms in your school to determine how much ledger paper could be collected every day.

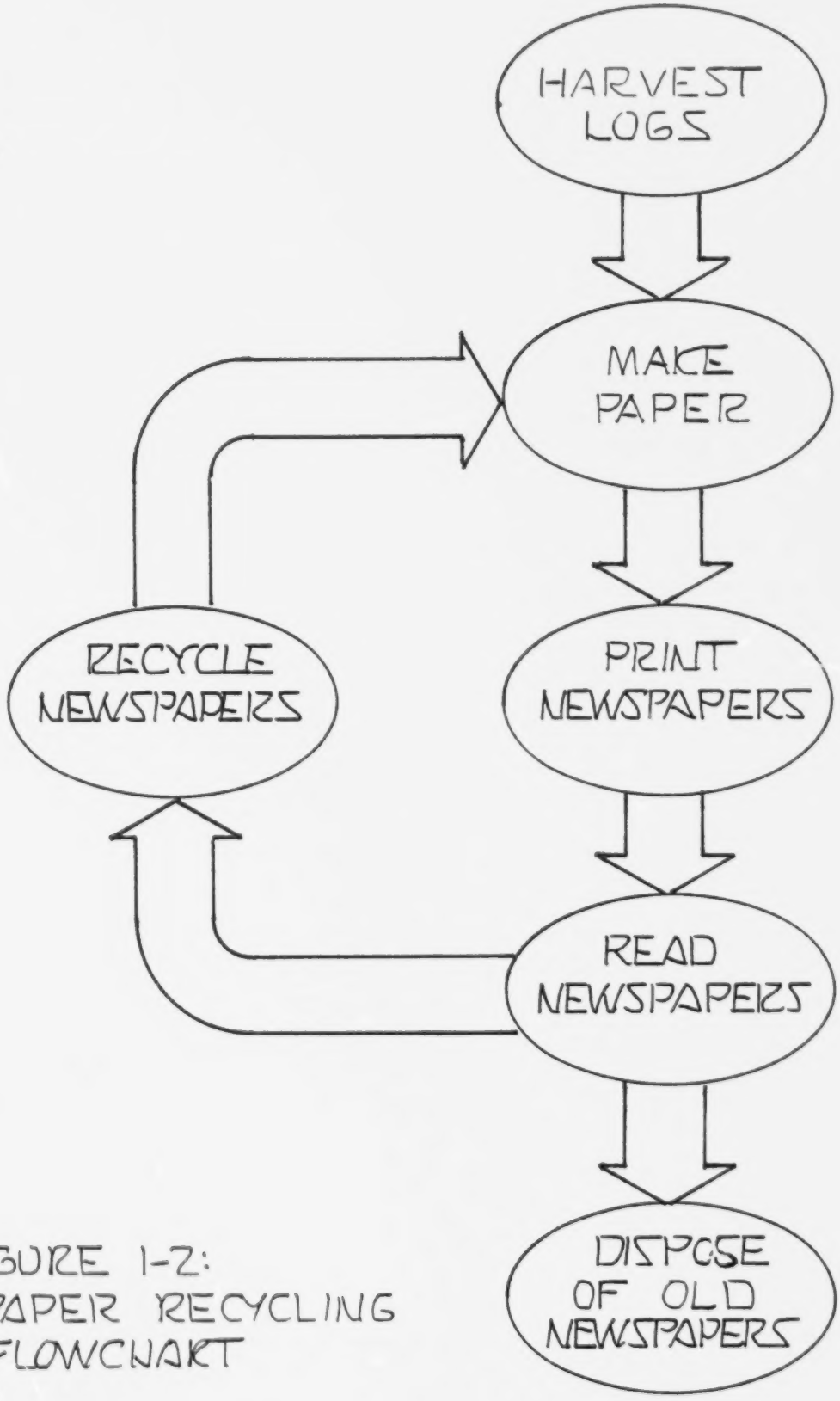


FIGURE 1-2:
PAPER RECYCLING
FLOWCHART

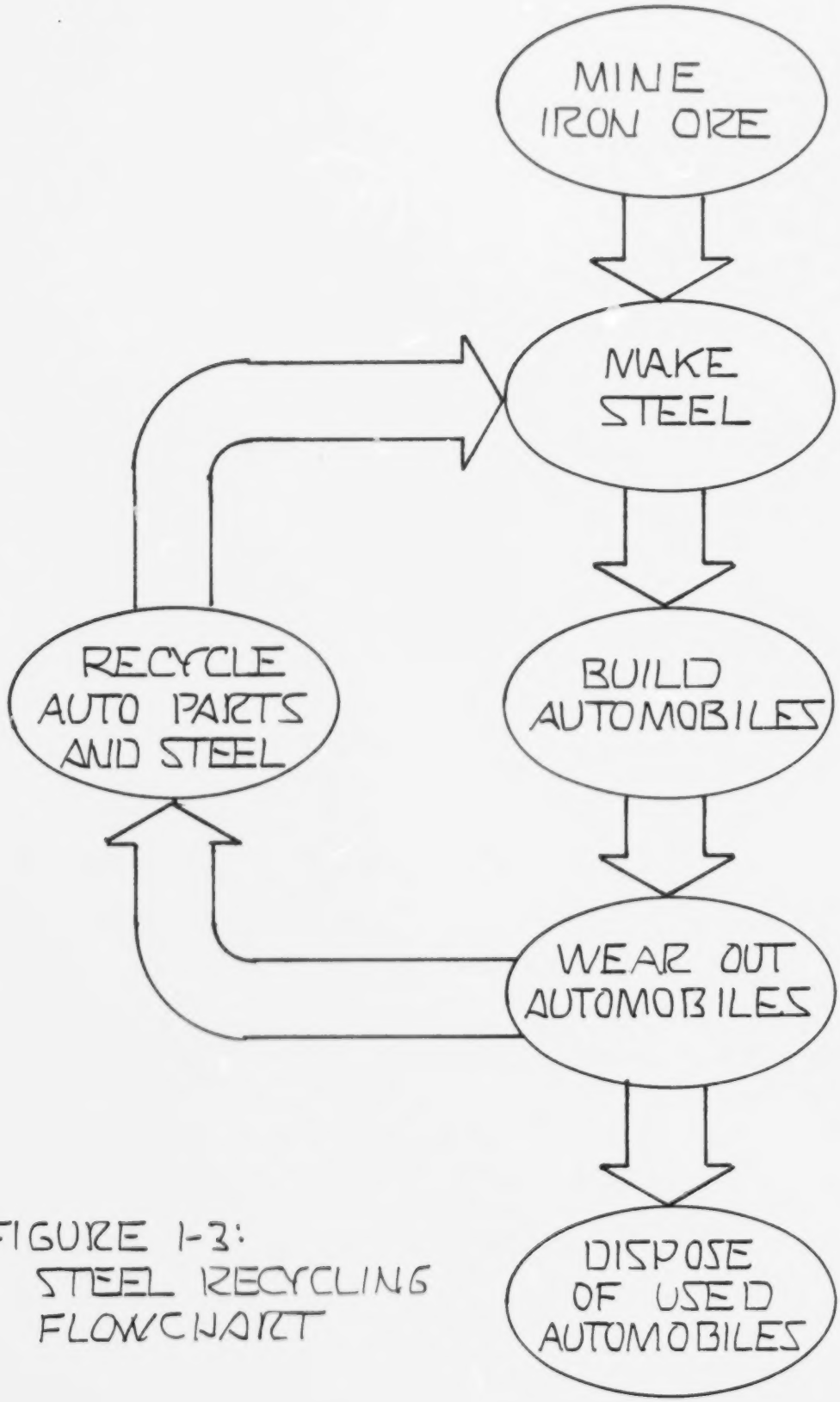


FIGURE 1-3:
STEEL RECYCLING
FLOWCHART

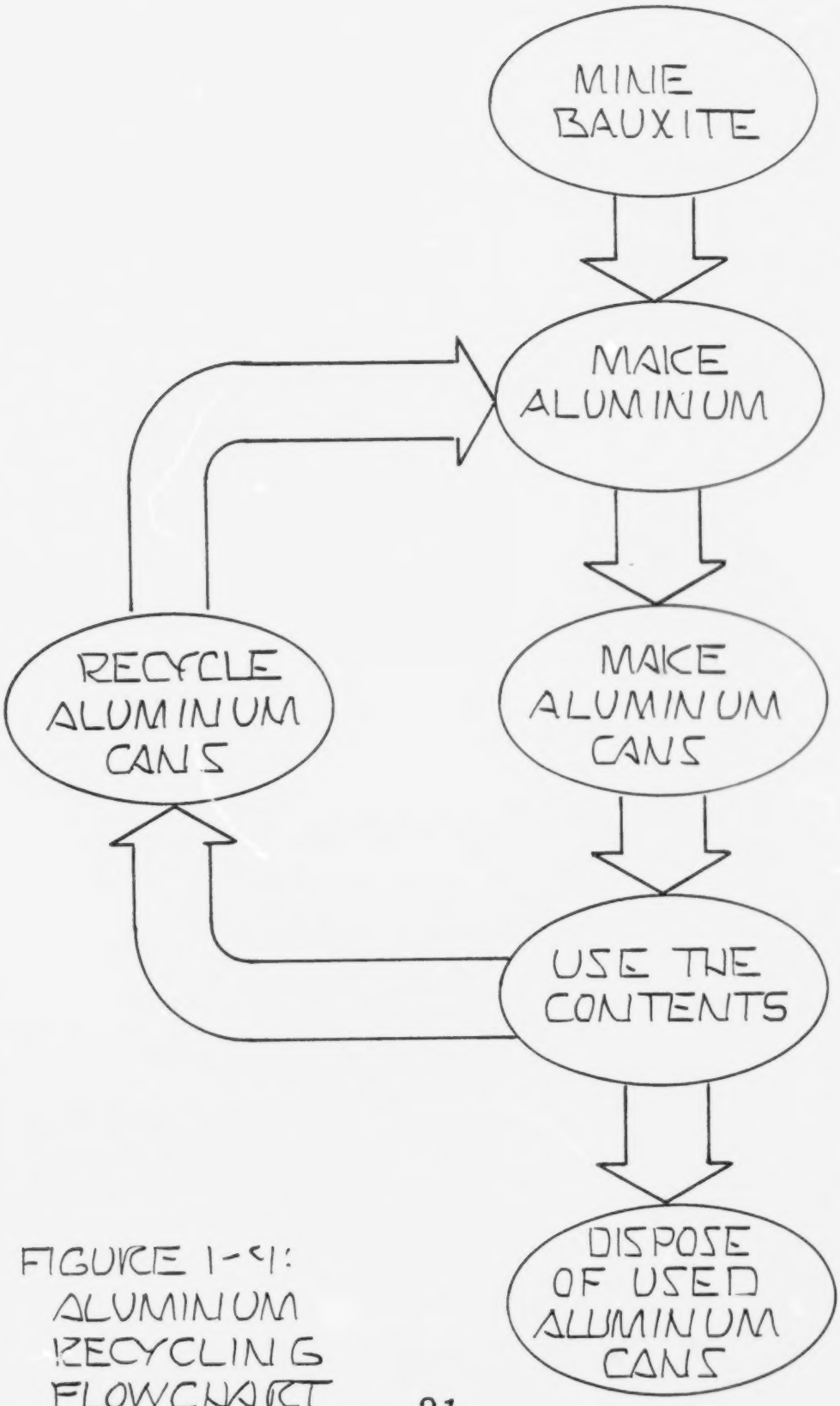


FIGURE 1-21: ALUMINUM RECYCLING FLOWCHART

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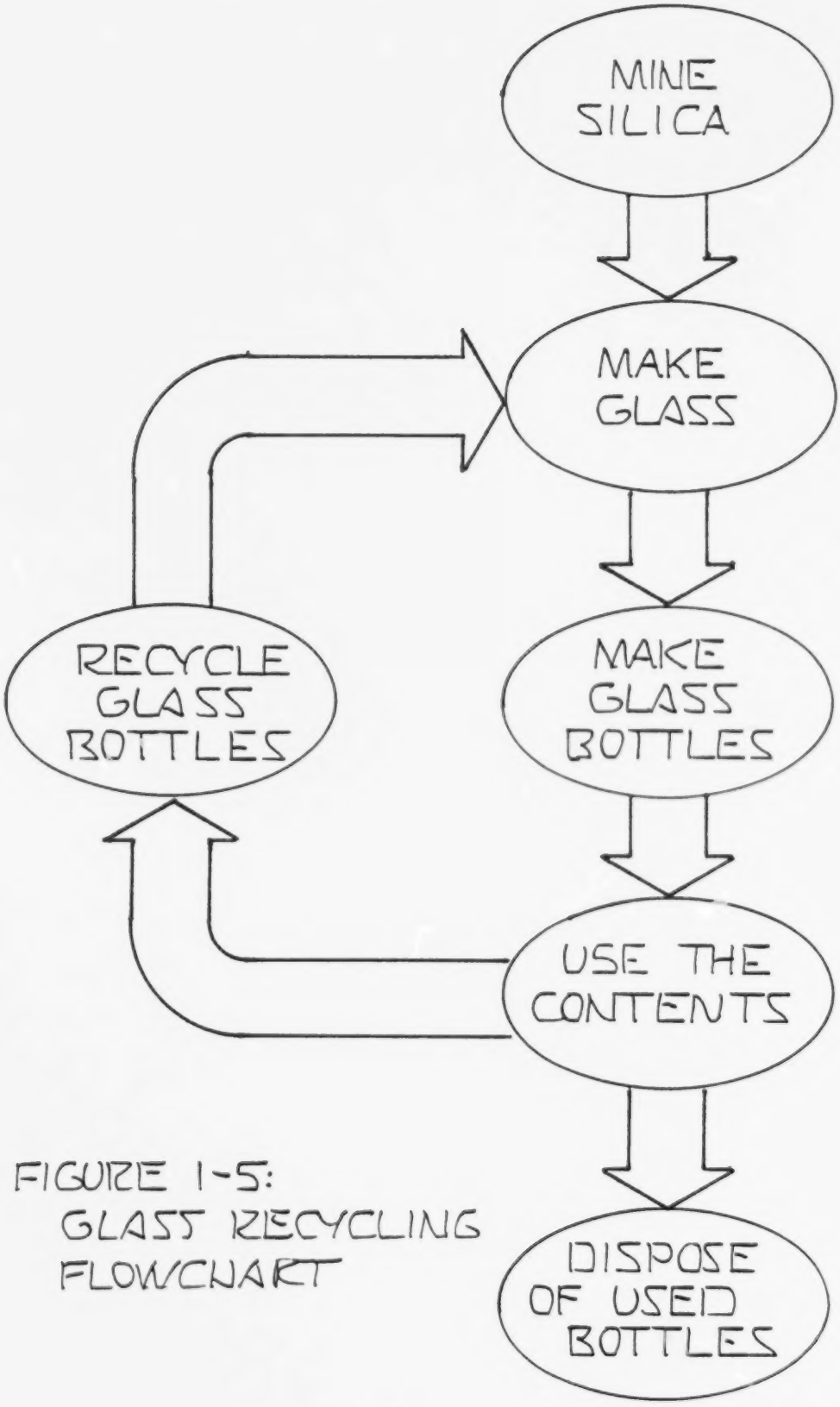


FIGURE 1-5:
GLASS RECYCLING
FLOWCHART

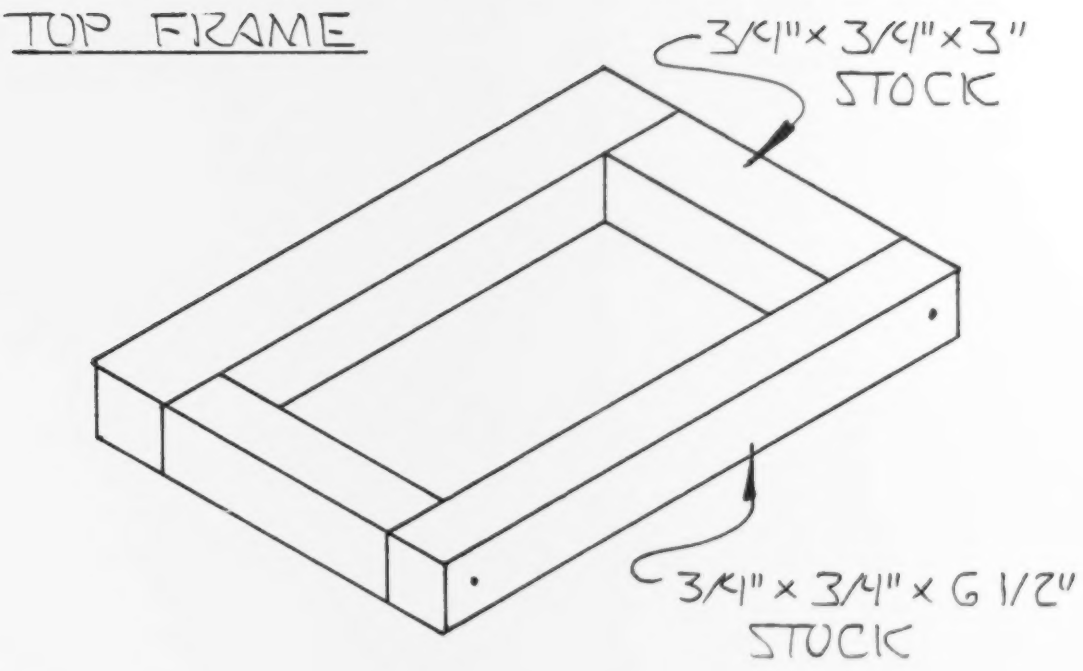


FIGURE 1-6: PAPER MAKING HARDWARE

OT #1-1

GARBAGE DISPOSAL STRATEGIES

- burying it in landfills
- burning it in incinerators
- dumping it on the land or in bodies of water

OT #1-2

Recycling is reusing materials to make new products.

OT #1-3

RECYCLABLE MATERIALS:

- aluminum
- steel
- brass
- copper
- lead
- cardboard
- paper
- glass
- organic materials

OT #1-4

RECYCLING:

- conserves natural resources
- saves energy
- reduces land, water and air pollution

OT #1-5

BASIC RECYCLING

- collecting
- sorting
- reprocessing

RECYCLING MATERIALS

Discussion:

We live in a "throwaway" society. When we go to the grocery store to buy food, our purchases are packed in paper bags. We use the bags to transport our groceries from the cart to our trunk, and from our trunk to our kitchen. After the groceries are put away, the bags are often thrown out. While at the grocery store, most of us buy beverages in throw-away aluminum cans or plastic bottles. When we prepare canned goods, we throw away the can. A lot of the food we purchase is packaged in glass jars. Unfortunately, once we have removed the contents, we throw away the jars. One trip to the grocery store can result in a garbage can full of throw-away paper, plastic, glass, and metal containers. Many of these containers are made of materials that can be recycled.

All materials have a life cycle. Even though they are not really alive, they are created, used to serve the needs of humankind, and then thrown away. The average person in th United States throws away about a ton of trash every year. Unfortunately, you can not really throw anything away; it has to be put somewhere. Most of our garbage is buried in land fills. Even though we can not see it after it has been buried, it is still there. In some parts of the United States, people are running out of places to put their garbage.

One way to solve our garbage disposal problem is to recycle a lot of the materials we throw away. This means short circuiting their life cycle. Instead of throwing useful materials away, we could reprocess them into new products. With recycling, old newspapers become new newspapers, old aluminum cans become new aluminum cans, and old glass jars become new glass jars. Some experts feel more than half of what we throw away could be recycled.

Recycling can help us conserve our natural resources. For example, recycling one ton of steel can conserve about 1 1/2 tons of iron ore. Recycling one ton of paper can help replace and preserve one acre of harvestable trees.

In addition to saving natural resources, recycling conserves energy. For example, making steel from scrap in an electric furnace requires about one quarter of the energy needed to produce steel from new ore. Making aluminum products from recycled cans requires about five percent of the energy needed to make aluminum from bauxite. Using

returnable bottles instead of aluminum can save even more energy. Making paper with recycled paper requires half the energy needed to make paper from trees.

Recycling also reduces many forms of pollution. Poorly planned land fills can contaminate nearby well water. Burning garbage in an incinerator can produce air pollutants. Dumping garbage on the land or in the water often results in land, air, and water pollution. Recycling reduces the need to burn, bury, or dump garbage. Thus, recycling can play an important role in solving our pollution problems.

Recycling materials involves a series of technological processes. These processes include:

- collecting
- sorting
- reprocessing

We are all familiar with the collection process. The local disposal company sends a truck down your street and picks up garbage and loads it into a garbage truck. Some communities have special containers for recyclable materials. When people want given materials to be recycled, they must deposit them in one of the containers. When the containers are full, workers from the recycling center collect the recyclable materials. When industry disposes of recyclable materials, the materials are put into special containers. A special truck drops off an empty container and picks up the full container and transports the materials to the recycling center.

During the sorting process, the garbage is separated into categories. In terms of recycling, it is very important to separate things like aluminum from steel, clear glass from colored glass, and newspaper from ledger paper. The sorting process is often performed by people like you. When we collect newspapers or aluminum cans for recycling, we are separating these materials from other materials. Sometimes, the sorting process is performed at a recycling center. For example, when automobiles are recycled, they are compressed and shredded into small pieces of scrap. The scrap travels over a magnetic drum. The magnet attracts the iron and steel scraps and separates them from other materials like rubber, plastic, and aluminum. However, in most cases, the best time to sort materials for recycling is before they are collected.

During reprocessing, the materials are broken down and used to make new products. For example, to make an automobile, metal ore is mined and transported to a steel mill. Inside the steel mill the ore is melted in furnaces and processed into steel. The steel is then used to make auto parts. The auto parts are assembled into an automobile. The average life of an automobile is about seven years. When the automobile is no longer worth repairing, it usually ends up in a salvage yard. There, many of its parts are removed, rebuilt, sold, and reused. The rest of the car is compressed, shredded, and melted down. The molten steel is used to make new auto parts and the process starts all over again.

Other recyclable materials are reprocessed in a similar manner. Glass is crushed, melted down, and used to make new glass products. Newspapers are shredded, reduced to pulp, and used to make new paper. Aluminum cans are shredded, melted down, and used to make new aluminum cans. Even organic materials like food scraps, glass clippings, and leaves can be chopped up and processed in to fertilizer.

We live in a throwaway society. Instead of throwing many materials away, we could recycle them. Recycling means reusing materials to make new products instead of burning, burying, and dumping them. Recycling can conserve natural resources, save energy, and reduce pollution. To recycle materials, they must be collected, sorted, and reprocessed.

Learning Activities:

Recycling small quantities of recyclable materials can defeat the purpose of recycling. With the current status of recycling technology, one can easily use more energy collecting and transporting materials than recycling will save. Therefore, it is important to collect enough recyclable materials to make the effort worthwhile.

One strategy for collecting large quantities of recyclable materials is to conduct a recycling campaign. During a recycling campaign, a group of people work together to promote recycling and collect recyclable materials. In addition to conserving natural resources, saving energy, and protecting our environment, a recycling campaign can help make people aware of the need to recycle materials. During the following learning activities, you will plan and execute a recycling campaign in your school.

Planning a Recycling Campaign:

1. The first step in planning a recycling campaign is to identify companies that recycle materials in your community. You do not want to collect a truck load of recyclable materials only to learn the nearest recycling center is 100 miles away. Even worse, if no one is able to recycle your materials locally, you could create a pollution and waste disposal problem for your school. In the blanks provided, list the recycling centers in your community, list the materials they recycle, and identify how much they will pay for each recyclable material.

Recycling Center Number One

Name: _____

Materials: Purchase Price:

_____ _____

_____ _____

_____ _____

Recycling Center Number Two

Name: _____

Materials: Purchase Price:

_____ _____

_____ _____

_____ _____

Recycling Center Number Three

Name: _____

Materials: Purchase Price:

_____ _____

_____ _____

_____ _____

2. The next step in the planning process is to identify your recycling options. Using the information listed above, circle the materials your class could collect and have recycled locally.

   A. newspapers
   B. ledger paper
   C. aluminum cans
   D. glass
   E. other _____

3. Using the information you have collected, select the best recyclable material for your recycling campaign. Discuss each of your recycling options. Identify the options that will allow you to collect the most materials with the least amount of effort for the greatest financial return. Write the name of the material you have selected for your recycling campaign in the space provided.

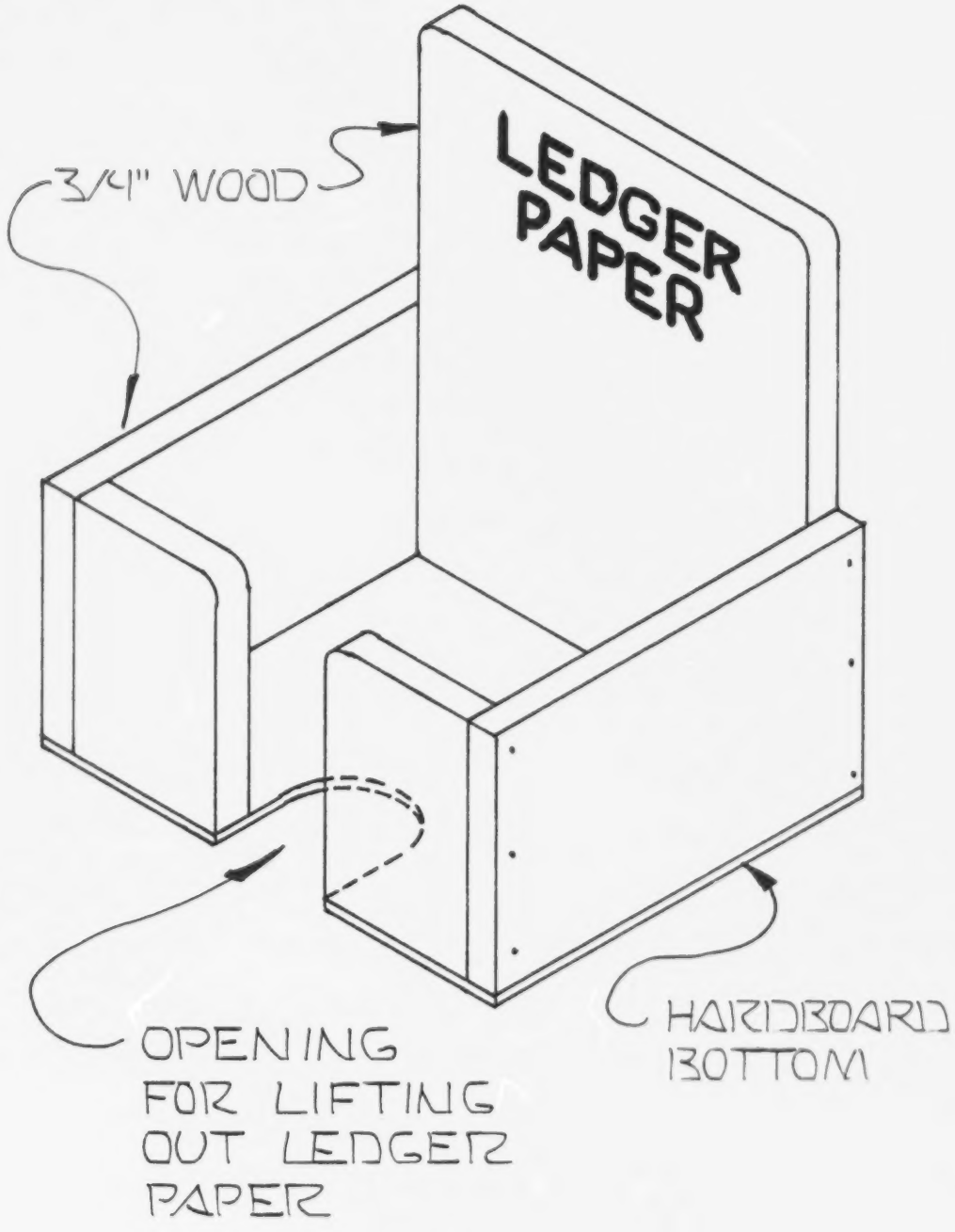
   _____

4. Once you have identified the material you want to recycle, you need to develop a material collection strategy. The first step in the collection planning process is to establish collection containers. For example, if you were to collect aluminum cans, one might want to label a plastic garbage can for recycling and place it next to other garbage cans. When students finish their lunch, they could put their waste paper in the regular garbage cans and deposit their aluminum cans in the recycling container.

   There are two major considerations when establishing containers for recyclable materials. The first consideration is to make sure the container is appropriate for the material being collected. When you select or design a container, you want to minimize the need to handle the material after it has been collected. The container should help organize the material it will hold. For example, if you were collecting ledger paper, you would want to use a container that creates nice neat stacks. Such a container might look like a box with about the same dimensions as a piece of paper (see Figure 1-7).

   The second consideration when establishing recycling containers to to make sure people know what to put into the container. The container needs to be clearly labeled so people are encouraged to recycle the material in question.

FIGURE 1-7: EXAMPLE LEDGER PAPER COLLECTION CONTAINER



In the space provided, sketch the container(s) that will be used to collect your recyclable materials. Show how you plan to label the container and provide the dimensions if necessary.

5. The second step in planning the collection process is to identify how and when the materials will be collected. For example, if you are collecting ledger paper and you have established a collection container in every classroom, who is going to collect the paper? When is the best time to collect the paper? Where will the paper be stored after it has been collected? These are questions that need to be answered before you conduct your recycling campaign. Plan your collection strategy by answering the following questions.

Who will collect the materials? _____

_____

_____

How will the materials be collected? _____

_____

_____

When will the materials be collected? _____

_____

_____

Where will the materials be stored? _____

_____

_____

6. The last step in the planning process is to identify how you will transport the materials from your school to the recycling center. The type of vehicle needed depends on how much material you collect, how often you will transport materials to the recycling center, and how long you will run your recycling campaign. During the transportation stage, you want to use as little energy as possible. It is more efficient to transport a large quantity of material in one vehicle. However, you may not be able to store large quantities of materials until you have a truck load. If the recycling center is close, you could make several trips and still save energy by recycling the material. Discuss your storage and transportation considerations. Using the space provided, describe your strategy for transporting your materials to the recycling center.

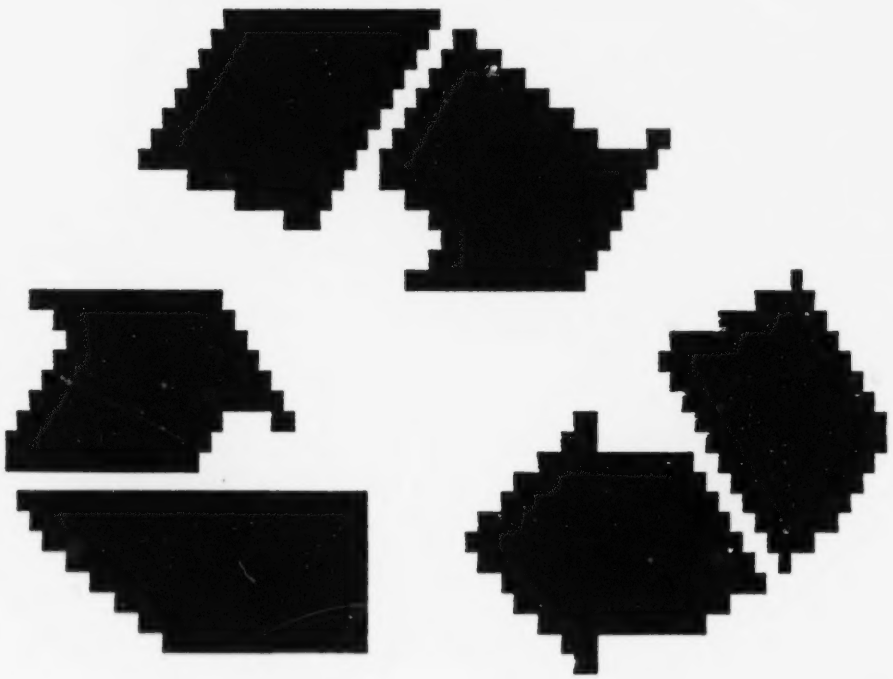
Promoting the Recycling Campaign

For a recycling campaign to be successful, you need to promote the idea of recycling. In addition, you need to tell people about your recycling campaign and how they can participate. One way to promote recycling and your recycling campaign is to make posters. The poster can present the advantages of recycling and how to participate in your recycling campaign (see Figure 1-8 and 1-9). Using the space provided below, sketch a plan for a recycling poster. When your sketch is complete, use the tools and materials provided by your teacher to make a poster.

NOTES

FIGURE 1-9: EXAMPLE RECYCLING POSTER

RECYCLING SAVES ENERGY



AND OUR NATURAL RESOURCES

FIGURE 1-8: EXAMPLE RECYCLING POSTER

Executing the Recycling Campaign

After carefully planning and promoting, you are now ready to execute your recycling campaign. Locate your collection containers in strategic locations throughout your school. Place your poster promoting recycling in an appropriate location in your school. Begin collecting recyclable materials.

Once you have collected a batch of recyclable materials, you need to prepare it for the recycling center. For example, if you are collecting ledger paper, you will need to inspect the paper and make sure it meets the recycling center's specifications. For example, some recycling centers will not accept paper containing staples, crayon, or glue.

After the material has been inspected and sorted, it needs to be prepared for storage and transportation. One of the goals recycling materials is to reduce pollution. Therefore, you want to package and store the materials as neatly as possible. If you are collecting ledger paper, you may want to package the paper in grocery bags. If you are collecting aluminum cans, you may want to crush them to save space. Because they often still contain a few drops of liquid, you may want to store them in plastic garbage bags. If you are collecting newspapers, you might want to store them in cardboard boxes from your local grocery or department stores.

You need to keep accurate records describing how many pounds of material you collect during the recycling campaign. Place each package of recyclable material on a scale and record its weight on the chart provided. After you have collected enough material, transport it to the recycling center.

Date	Total Pounds Collected
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Reporting the Results of the Recycling Campaign

Last, but not least, share the results of your recycling campaign with your school community. After all, their contribution helped make your campaign a success. They need to know they helped make a difference. When you report the results, consider using your school newspaper or PA system to report how many pounds of recyclable materials were collected and recycled. If you were compensated for the materials, report how much money you were able to raise through recycling.

EXPLORING INDUSTRY AND ITS TECHNOLOGIES

Unit: Recycling Materials — Lesson 2: Evaluation

Objectives	Lesson Content	Learning Activities	Ref.
A. Following a discussion, students will be able to complete given concept statements regarding recycling materials with a minimum of 70% accuracy.	A. Review 1. Garbage disposal strategies 2. Definition for recycling 3. Recyclable materials 4. Advantages of recycling 5. Basic recycling processes	A. Teacher Guided Review 1. Review the major concepts explored in this unit. 2. Provide students with an opportunity to ask questions before taking the test. 3. Provide students with HO #2-1. Make sure each student has a pen or pencil. 4. Explain the directions for the test. 5. Have students read the test and answer the questions provided. 6. Collect the tests and grade your students' performance. 7. Provide students with feedback regarding their test performance as soon as possible.	

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RECYCLING MATERIALS

Directions: Read each statement carefully. Circle the letter of the answer you think best answers the question.

1. Recycling is _____.

   A. using raw materials to make new products
   B. burning, burying, and dumping waste materials
   C. reusing materials to make new products
   D. using standard stock to make new products

2. The average person in the United States throws about _____ of trash every year.

   A. 100 pounds
   B. 500 pounds
   C. 1000 pounds
   D. one ton

3. Most of the communities in Illinois dispose of their garbage by _____.

   A. burying it in landfills.
   B. burning it is incinerators
   C. dumping it at garbage dumps
   D. dumping it in large bodies of water

4. Experts feel we could recycle about _____ what we throw away.

   A. 1/8
   B. 1/4
   C. 1/2
   D. 3/4

5. Recycling can help us _____.

   A. conserve our natural resources
   B. save energy
   C. reduce pollution
   D. all the above

6. To preserve one acre of harvestable trees, we need to recycle about one ton of _____.

A. aluminum
B. paper
C. steel
D. glass

7. Automobile salvage yards recycle _____.

A. auto parts and steel
B. paper and cardboard
C. aluminum and copper
D. glass and plastic

8. Burning garbage in an incinerator often results in _____.

A. air pollution
B. water pollution
C. land pollution
D. all the above

9. The raw material used to make paper is _____.

A. iron ore
B. bauxite
C. trees
D. silica

10. Separating clear glass from colored glass is an example of _____.

A. collecting
B. sorting
C. transporting
D. reprocessing

11. Shredding and melting down aluminum cans is an example of _____.

A. collecting
B. sorting
C. transporting
D. reprocessing

12. Having the garbage picked up in front of your house is an example of _____.

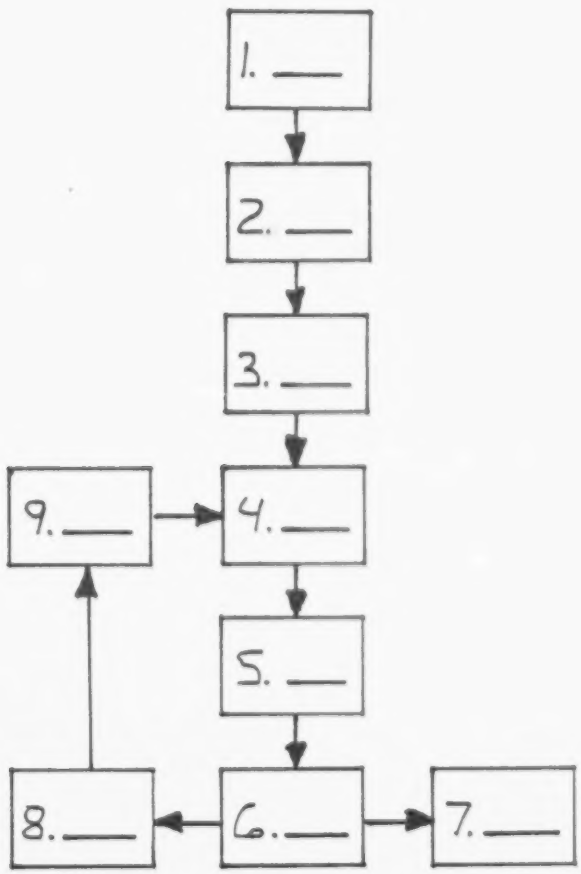
A. collecting
B. sorting
C. transporting
D. reprocessing

13. Which of the following recycling processes are performed if you save, crush, and drop off your aluminum cans at a recycling center?

A. collecting
B. sorting
C. reprocessing
D. all the above

14. Using the items listed below, complete the flowchart illustrating the life cycle of an automobile.

A. use mining techniques to extract iron ore from the earth
B. use the automobile until it is not worth repairing
C. process the iron ore into standard stock in a steel mill
D. sell the automobile to a salvage yard for recycling
E. use the steel to manufacture auto parts
F. remove, rebuild, sell and reuse the parts from junked automobiles
G. use the auto parts and other materials to manufacture automobiles
H. use the molten steel to manufacture new auto parts
I. compress, shred, and melt the scrap steel from junked automobiles



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"Resource Recycling," 1615 N. W. 23rd St., Suite One, P. O. Box 10540, Portland, OR 97210. Phone: (503)227-1319. $18.00/year.

Filmstrips:

Recycling Resources. National Association of Recycling Industries, Inc., 330 Madison Avenue, New York, NY 10017. Cost: Free, but borrower pays return postage. Availability: Book 30 days in advance.

Videotape:

"Kid Power - What the World Needs Now." Available through: Capital Recycling, P. O. Box 751, Springfield, IL 62705. A brief statement about how young people can impact our environment through conservation efforts. Geared toward upper grade and junior high. Capital Recycling also has the materials available.

"Waste Disposal." #4 of the Human Community Series. Available through: Illinois State Board of Education, Television Library, 100 North First Street, Springfield, IL 62777. Send for the videotape catalog for more possible listings. Many tapes can be duplicated for future use.